## REMARKS

Applicant concurrently files herewith an Excess Claims Fee Payment Letter for excess claims.

Claims 1-22 are all the claims presently pending in the application. New claims 11-22 have been added to more completely define the invention

It is noted that the claims have been amended solely to more particularly point out Applicant's invention for the Examiner, and not for distinguishing over the prior art, narrowing the claim in view of the prior art, or for statutory requirements directed to patentability.

Attached hereto is a marked-up version of the changes made to the claims by the currently amendment. The attached pages are captioned **"Version with markings to show changes made"**.

Claims 1 and 2 (and presumably 3-10) stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Zhong et al. (U.S. Patent No. 5,994,721) (hereinafter "Zhong").

This rejections is respectfully traversed in view of the following discussion.

## I. THE CLAIMED INVENTION

Applicant's invention, as defined for example in independent claim 1 and substantially similarly in independent claims 2, 6, and 7) is directed to an active matrix liquid crystal display device (LCD) having a color filter on a substrate on which switching elements are formed.

A feature of the present invention is that a portion of a passivation film, covering a display area to be covered with a color filter, is selectively removed and a hole formed therein. Then, the hole area is filled with a color filter while another portion of the passivation film covers a thin film transistor (TFT).

Thus, it is possible to make a color filter on a contact portion and on a pattern outline portion thin, while the color filter on the pixel opening portion is thick. In this manner, a high photosensitive color resist can be used and a fine pattern with small exposure can be formed.

Thus, an LCD having good display quality, high precision and a high aperture can be manufactured (e.g. see page 5, lines 13-24; page 11, lines 25-27; page 12, lines 1-2; page 13, lines 9-18; and page 17, lines 1-12).

An exemplary configuration of the on-chip color filter is shown in Figs. 3(b) and 4(a)-4(c) of the application.

The conventional structures, such as those discussed below and in the Related Art section of the present application, do not have such a structure, and fail to provide for such an operation.

Indeed, such features are clearly not taught or suggested by the cited reference.

## II. THE ZHONG REFERENCE

The Examiner asserts that:

> *[regarding claim 1] Zhong does not explicitly disclose and does not preclude a passivation film for protecting said thin film transistors (TFTs). The use of passivation films to protect TFTs is well known in the art of liquid crystals.*
>
> *Zhong is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to remove the gate insulating layer (and necessarily the overlying passivation layer) from the light transmission region within pixels prior to depositing the color filter in order to achieve adequate color filter layer thickness to minimize pixel electrode capacitance (column 6, lines 1-35).*
>
> *Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify a conventional RGB active matrix LCD configuration with [a] passivation layer by removing the gate insulating layer (and necessarily the overlying passivation layer) from the light transmission region within pixels prior to depositing the color filter.*

However, Applicant respectfully disagrees, and asserts the Examiner is engaging in prohibited hindsight reconstruction of Applicant's invention.

As the Examiner admits on page 3 of the Office Action, Zhong fails to teach or suggest a passivation film. The Examiner asserts that the use of a passivation film to protect TFTs is well known in the art of liquid crystals. However, the Examiner's conclusion is erroneous and the Applicant respectfully submits that such a conclusion is based upon a misunderstanding of the novel features of the present invention.

Specifically, a feature of present invention is not in merely providing a passivation film, but in providing that a portion of a passivation film, corresponding to a display area to be covered with a color filter, is removed to make a hole therein while providing another portion of the passivation film to cover a TFT. Then, the hole provided in the passivation film is filled with the color filter. Zhong fails to teach or suggest this feature of the present invention, nor is there any reason to modify Zhong.

The use of passivation, as discussed in the "Description of the Related Art" portion of the specification, is well known in the art. However, as discussed in the specification with reference to the prior art device (e.g., see Fig. 1), a person having ordinary skill in the art would form a passivation film over a whole surface of a TFT substrate, not just a portion of the TFT substrate as in the invention.

That is, the passivation film of the conventional art covers not only a TFT, but also a display portion over which a color filter is to be formed. Accordingly, if a passivation film is applied to the device of Zhong in accordance with the well-known technique in the art of liquid crystals, such a passivation film would be formed over an entire surface of the substrate 19 of Zhong.

Thus, in Zhong, the passivation film is between the color filter 10 and the substrate 19. The device of Zhong formed with such a conventional structure is nothing more than a prior art device that contains the problems to be solved by the novel present invention. Nowhere does the structure disclosed in Zhong teach or suggest a passivation film being selectively removed from over the display portion while keeping a TFT covered. Clearly, the Examiner has studied Applicant's invention and specification and has in turn unreasonably gone to the "parts bin" to selectively pick and choose in an attempt to produce Applicant's invention.

Further, despite the Examiner's assertions, there is no motivation or suggestion to

modify Zhong to teach or suggest the present invention, absent hindsight reasoning based upon a reading of Applicant's invention. Applicant respectfully notes that the problems associated with a prior art device having a passivation film formed over an entire area of a TFT substrate have been identified by the Applicant.

Thus, the features of the present invention, as discussed above, would not be obvious from the teachings of Zhong and the other conventional art references of the liquid crystal field, either alone or in combination.

Hence, turning to the clear language of independent claim 1 (and substantially similarly independent claims 2, 6, and 7), there is no teaching or suggestion of "*[an] active matrix liquid crystal display device comprising:*

*a first substrate and a second substrate, at least one of the first and second substrates being transparent;*

*a liquid crystal layer between the first and second substrate;*

*a color filter, said first substrate including a plurality of scanning lines;*

*a plurality of signal lines crossing the scanning lines in a matrix manner;*

*a plurality of thin film transistors formed at intersections of the scanning lines and signal lines, respectively;*

*a pixel electrode connected to said plurality of thin film transistors, said second substrate including a counter electrode;*

*liquid crystal molecules being driven by an electric field between said pixel electrode and said counter electrode to thereby make a display, wherein said color filter is formed on a passivation film for protecting said thin film transistors, and*

*said pixel electrode is arranged on said color filter and connected to said thin film transistors through a contact hole provided in said passivation film and said color filter; and*

*gate insulating layers of said thin film transistors and said passivation film being removed in a light transmission region within pixels surrounded by said scanning lines and said signal lines*".

For the reasons stated above, independent claims 1, 2, 6, and 7 are fully patentable over the cited references.

Further, dependent claims 3-5 and 8-10 when combined with their respective

independent claims recite additional novel and non-obvious features (as do new claims 11-22).

Further, the other prior art of record has been reviewed, but it too even in combination with Zhong fails to teach or suggest the claimed invention.

## III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 1-22, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: 4/30/02

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## VERSION WITH MARKINGS TO SHOW CHANGES MADE

**IN THE CLAIMS**:

**The claims have been amended as follows:**

1. (Amended) An active matrix liquid crystal display device comprising:

a first substrate and a second substrate, at least one of the first and second [substrates] substrate being transparent;

a liquid crystal layer [put] between the first and second [substrates] substrate;

a color filter, said first substrate including a plurality of scanning lines;

a plurality of signal lines crossing the scanning lines in a matrix manner;

a plurality of thin film transistors formed at intersections of the scanning lines and signal lines, respectively;

a pixel electrode connected to said plurality of thin film transistors, said second substrate including a counter electrode[,];

liquid crystal molecules being driven by an electric field between said pixel electrode and said counter electrode to thereby make a display, wherein said color filter is formed on a passivation film for protecting said thin film transistors[;], and said pixel electrode is arranged on said color filter and connected to said thin film transistors through a contact hole provided in said passivation film and said color filter; and

gate insulating layers of said thin film transistors and said passivation film [are] being removed in a light transmission region within pixels surrounded by said scanning lines and said signal lines.

2. (Amended) An active matrix liquid crystal display device comprising:

a first substrate and a second substrate, at least one of the first and second substrate being transparent;

a liquid crystal layer [put] formed between the first and second substrate;

a color filter;

an overcoat layer protecting said color filter, said first substrate including a plurality

of scanning lines;

a plurality of signal lines crossing the plurality of scanning lines in a matrix manner;

a plurality of thin film transistors formed at intersections of the scanning lines and the signal lines, respectively;

a pixel electrode connected to said thin film transistors, said second substrate including a counter electrode, liquid crystal molecules being driven by an electric field between said pixel electrode and said counter electrode to thereby make a display, wherein said color filter is formed on a passivation film for protecting said thin film transistors[;], said overcoat layer is formed on said color filter[;], and said pixel electrode is arranged on said overcoat layer and connected to said thin film transistors through a contact hole provided in said passivation film, said color filter and said overcoat layer; and

gate insulating layers of said thin film transistors and said passivation film are removed in a light transmission region within pixels surrounded by said scanning lines and said signal lines.

6. (Amended) A method of manufacturing an active matrix liquid crystal display device, the method comprising [the steps of]:

forming a plurality of scanning lines on a first substrate;

forming a plurality of signal lines crossing the plurality of scanning lines in a matrix manner;

forming a plurality of thin film transistors at intersections of the plurality of scanning lines and the plurality of signal lines, respectively;

forming a pixel electrode connected to said thin film transistors;

forming a counter electrode on a second substrate;

injecting a liquid crystal between said first substrate and said second substrate and sealing the liquid crystals,

wherein said method further [comprising the steps of] comprises:

forming a passivation film to protect each of said thin film transistors;

removing part of a gate insulating layer and said passivation film of each of said [tin] thin film transistors in a region surrounded by said signal lines and said

scanning lines;

forming a color filter made of a photosensitive color resist; and

forming a transparent conductive film.

7. (Amended) A method of manufacturing an active matrix liquid crystal display device, the method comprising [the steps of]:

forming a plurality of scanning lines on a first substrate;

forming a plurality of signal lines crossing the plurality of scanning lines in a matrix manner;

forming a plurality of thin film transistors at intersections of the plurality of scanning lines and the plurality of signal lines, respectively;

forming a pixel electrode connected to said thin film transistors;

forming a counter electrode on a second substrate;

injecting liquid crystal between said first substrate and said second substrate and sealing the liquid crystals,

wherein said method further [comprising the steps of] comprises:

forming a passivation film to protect each of said thin film transistors;

removing part of a gate insulating layer and said passivation film of each of said [tin] thin film transistors in a region surrounded by said signal lines and said scanning lines;

forming a color filter made of a photosensitive color resist;

forming an overcoat layer on said color filter;

patterning said overcoat layer;

forming a contact hole by patterning said color filter while using said overcoat layer as a mask; and

forming a transparent conductive film.

**The following new claims have been added.**

-- 11. An active matrix liquid crystal display device, including:

a plurality of pixels, each of said pixels comprising:

a transistor;

a passivation film formed to cover said transistor, said passivation film having a first hole exposing an electrode of said transistor and a pixel opening;

a color filter formed to fill said pixel opening of said passivation film, said color filter having a second hole; and

a pixel electrode formed to cover said color filter and to be connected to the electrode of said transistor through said first and second holes.

12. The device as claimed in claim 11, wherein said color filter has a substantially flat surface so that a first portion of said color filter filling said pixel opening is larger in thickness than a second portion of said color filter covering said passivation film.

13. The device as claimed in claim 12, wherein said transistor includes a gate insulating film, said gate insulating film having a third hole that is formed correspondingly to said pixel opening of said passivation film and is filled with said color filter.

14. The device as claimed in claim 12, wherein said color filter is extended to cover said transistor with an intervention of said passivation film.

15. The device as claimed in claim 12, wherein each of said pixels further comprises an overcoat layer inserted between said color filter and said pixel electrode.

16. The device as claimed in claim 12, wherein each of said pixels further comprises a signal line connected to said transistor, said color filter provided for one of said pixels being extended to and terminated on the signal line connected to an adjacent one of said pixels with an intervention of a part of said passivation film.

17. A method of manufacturing an active matrix liquid crystal display device, the method comprising:

forming a plurality of pixels, said forming of said plurality of pixels comprising, for each of said pixels:

providing a transistor;

forming a passivation film to cover said transistor;

forming a first hole in said passivation film exposing an electrode of said transistor and a pixel opening;

forming a color filter to fill said pixel opening of said passivation film, said color filter having a second hole; and

forming a pixel electrode to cover said color filter and connect to the electrode of said transistor through said first and second holes.

18. The method as claimed in claim 17, wherein said color filter has a substantially flat surface so that a first portion of said color filter filling said pixel opening is larger in thickness than a second portion of said color filter covering said passivation film.

19. The method as claimed in claim 18, wherein said transistor includes a gate insulating film, said gate insulating film having a third hole that is formed correspondingly to said pixel opening of said passivation film and is filled with said color filter.

20. The method as claimed in claim 18, wherein said color filter is extended to cover said transistor with an intervention of said passivation film.

21. The method as claimed in claim 18, further comprising, for each of said pixels, inserting an overcoat layer between said color filter and said pixel electrode.

22. The method as claimed in claim 18, further comprising, for each of said pixels, each of said pixels, providing a signal line connected to said transistor, said color filter provided for one of said pixels being extended to and terminated on the signal line connected to an adjacent one of said pixels with an intervention of a part of said passivation film. --